

**Remarks**

**I. Status of claims**

Claims 1-20 are pending.

Claims 1, 11, 16, 18, and 19 have been amended.

**II. Objections to the drawings**

FIGS. 1-3 have been amended to address the Examiner's concerns. The Examiner's objections to the drawings now should be withdrawn.

**III. Objections to the specification**

The specification has been amended to address the Examiner's objections to the specification. Regarding the Examiner's requested citation to a reference describing the well-known C4.5 type Decision Tree algorithm, the Examiner's attention is directed to U.S. Patent No. 5,719,692 (cited in the Form PTO 1149 filed herewith), which provides evidence that C4.5 type Decision Tree algorithms were well-known at the time of the present invention (see, e.g., col. 2, lines26-38). If the Examiner requires additional details regarding the C4.5 Decision Tree algorithm, the Examiner is invited to review the seminal book by John Ross Quinlan, entitled "C4.5: Programs for Machine Learning" (Morgan Kaufmann, San Mateo, CA, 1993).

The Examiner's objections to the specification now should be withdrawn.

**IV. Objections to the claims**

The Examiner has objected to claims 11, 14, 18, and 19 under 35 U.S.C. § 112, fourth paragraph, and under 37 CFR 1.75(c).

35 U.S.C. § 112, fourth paragraph, provides that (emphasis added):

Subject to the following paragraph, a claim in dependent form shall contain a reference to a claim previously set forth and then specify a further limitation of the subject matter claimed.

A claim in dependent form shall be construed to incorporate by reference all the limitations of the claim to which it refers.

37 CFR 1.75(c) provides in part that (emphasis added):

One or more claims may be presented in dependent form, referring back to and further limiting another claim or claims in the same application. . .

A. Claim 11

Amended claim 11 depends from claim 10 and recites that the scrutiny classifier is generated on-the-fly from a set of training records corresponding to the selected subset of classes.

With respect to claim 11, the Examiner has asserted that “on-the-fly” is sequential to item 26 of Fig. 1 and therefore conveys no further limitation.” Contrary to the Examiner’s assertion, however, “on-the-fly” further limits claim 10 by specifying that the scrutiny classifier is generated “on-the-fly” rather than, for example, “generated beforehand in anticipation of a new instance to be classified,” as described in the specification on page 7, line 6, through page 8, line 16. That is, claim 11 further limits claim 10 because claim 11 does not cover methods within the scope of claim 10 in which the scrutiny classifier is not generated on-the-fly.

B. Claim 14

Claim 14 depends from claim 13 and recites the step “further comprising selecting an inclusive class set encompassing the selected subset of classes from which to generate the scrutiny classifier.” Regarding claim 14 the Examiner has asserted that “selecting an inclusive class set encompassing the selected subset of classes” conveys no further limitation. None of the antecedent claims from which claim 14 depends, however, specifies the step of selecting an inclusive class set. Therefore, contrary to the Examiner’s assertion, claim 14 further limits the subject of the antecedent claims from which it depends because claim 14 does not cover methods within the scope of the antecedent claims in which the step of selecting an inclusive class set is not performed.

C. Claim 18

Claim 18 depends from claim 16 and recites that the system further comprises an inducer configured to generate a scrutiny classifier. Claim 18 further limits claim 16 because it does not cover systems within the scope of claim 16 that do not include an inducer as recited in claim 18.

D. Claim 19

Claim 19 depends from claim 18 and recites that the inducer is configured to generate the scrutiny classifier on-the-fly from a set of training records corresponding to the selected subset of classes. With respect to claim 19, the Examiner has asserted that “on-the-fly” is sequential to item 26 of Fig. 1 and therefore conveys no further limitation.” Contrary to the Examiner’s assertion, however, “on-the-fly” further limits claim 18 by specifying that the scrutiny classifier is generated “on-the-fly” rather than, for example, “generated beforehand in anticipation of a new instance to be classified,” as described in the specification on page 7, line 6, through page 8, line 16. That is, claim 19 further limits claim 18 because claim 19 does not cover methods within the scope of claim 10 in which the scrutiny classifier is not generated on-the-fly.

E. Conclusion

For at least the reasons explained above, the Examiner’s objections to claims 11, 14, 18, and 19 should be withdrawn.

V. Claim rejections under 35 U.S.C. § 112

A. Record filter 36

The Examiner has rejected claims 1-20 under 35 U.S.C. § 112, first paragraph, as failing to comply with the enablement requirement. In particular, the Examiner has asserted in part that:

The claim(s) contains subject matter which was not described in the specification in which a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected to make and/or use the invention. Specification at page 6, lines 30-31 cite: "The second training records set 24, may be identified by applying a record filter 36 to the entire training set 18." The specification is silent on the workings of the record filter. The nature and character of this filter are fundamental to the workings of the invention and without such disclosure, one of ordinary skill would have to exercise undo experimentation to achieve the successful workings of this invention. ...

1. The Examiner has Failed to Establish a Prima Facie Case of Nonenablement

As stated by the Federal Circuit:

When rejecting a claim under the enablement requirement of Section 112, the [Patent Office] bears an initial burden of setting forth a reasonable explanation as to why it believes that the scope of protection provided by the claim is not adequately enabled by the description of the invention provided in the specification of the application; this includes, of course, providing sufficient reasons for doubting any assertions in the specification as to the scope of enablement.<sup>1</sup>

The Examiner merely asserts that the "nature and character of this filter are fundamental to the workings of the invention and without such disclosure, one of ordinary skill would have to exercise undo experimentation to achieve the successful workings of this invention." The Examiner, however, fails to provide a rational basis as to why the disclosure does not teach the manner and process of making and using the invention of claims 1-20 to one of ordinary skill in the art, without undue experimentation, and dealing with subject matter that would not already be known to the skilled person as of the filing date of the application.

None of claims 1-20 specifically recites a record filter. The Examiner has failed to explain why the "nature and character of this filter are fundamental to the workings of the invention" recited in claims 1-20. Contrary to the Examiner's assertion, the record filter 36 per se is not "fundamental to the workings of the invention" recited in claims 1-20. The

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<sup>1</sup> *In re Wright*, 999 F.2d 1557, 27 USPQ 2d 1510, 1513 (Fed. Cir. 1993).

record filter 36 is described in the context of one embodiment of the invention. Other embodiments within the scope of the claims do not require such a record filter. For example, in some embodiments, the inducer used to generate the scrutiny classifier may simply select the set of training records corresponding to a class set inclusive of the subset of classes selected by the ballpark classifier for a given instance either directly from the entire training records set 18 or by giving no weight to the training records in set 18 that do not correspond to a class set inclusive of the subset of classes selected by the ballpark classifier for the given instance.

In addition, the specification teaches that:

Scrutiny classifier 20 is generated by second inducer 22 from a second set of training records corresponding to the subset of classes selected by ballpark classifier 14 (step 34). The second training records subset may be identified by applying a record filter 36 to the entire training records set 18.

The Examiner has failed to explain why one skilled in the art could not implement a record filter that can be applied to the entire training records set 18 to identify training records corresponding to the subset of classes selected by ballpark classifier 14. To provide such functionality, the record filter simply has to select training records from the entire training records set 18 with class labels matching the classes selected by the ballpark classifier 14. Anyone skilled in the art at the time of the invention readily could have designed such a record filter.

For this reason, the Examiner's rejection of claims 1-20 under 35 U.S.C. § 112, second paragraph, should be withdrawn.

2. In any event, claims 1-20 are enabled

The general rule is that the subject matter required to enable the invention need only be found in the application and/or the prior art for the application to be enabling under Section 112, first paragraph.

As explained in the preceding section, the specification teaches that record filter 36 is applied to the entire training records set 18 to identify training records corresponding to the subset of classes selected by ballpark classifier 14. The specification explains that, "in one embodiment, the training records set 18 corresponds to a database table containing a list of

attributes, one of which is designated as a class label attribute" (page 6, lines 12-14). To provide the functionality of the record filter 36 described in the specification, the record filter 36 simply has to select training records from the entire training records set 18 with class labels matching the classes selected by the ballpark classifier 14. Anyone skilled in the art at the time of the invention readily could have designed such a record filter (see, e.g., Ben Forta, Sams Teach Yourself SQL in 10 Minutes, SAMS, 2nd edition (April 26, 2001)).

U.S. Patent No. 5,930,803 (copy attached in Appendix) is one example of a prior art reference that describes the use of a record filter in a data classifier. The '803 patent describes an approach to visualizing an evidence classifier that includes an importance slider that "permits a user to control the filtering of attributes to a classification of unlabeled records" (col. 10, lines 26-28). The '803 patent explains that (col. 10, lines 25-36):

Importance is a measure of the predictive power with respect to a label. For example, an evidence inducer can assign importance value in a range from 0 to 100. As slider 430 is shifted away from zero toward the right-hand side of display 400, attributes that fall below the importance slider are removed from display view 415. If attributes are sorted by importance, then attributes at the bottom of the sort are removed first.

That is, in the approach of U.S. Patent No. 5,930,803, a record filter filters from a data set used to classify unlabeled records based on importance values that are assigned to the attributes of the records in the data set. Such a record filter may provide the functionality of the record filter 36 described in the present application simply by assigning an importance value greater than the threshold to class label attributes corresponding to the subset of classes selected by ballpark classifier 14 for a given instance and assigning an importance value less than the threshold to other record attributes. Thus, one of ordinary skill in the art at the time of the invention readily could have designed a record filter with the functionality of the record filter 36 described in the present application as evidence by the teachings of U.S. Patent No. 5,930,803 (cited in the Form PTO 1149 filed herewith).

3. Conclusion

For at least the reasons explained above, the Examiner's rejection of claims 1-20 under 35 U.S.C. § 112, first paragraph, based on his assertion of nonenablement of the record filter 36 should be withdrawn.

B. Misclassification cost

The Examiner also has rejected claims 1-20 under 35 U.S.C. § 112, first paragraph, as failing to comply with the enablement requirement based on the following assertion:

... Further to claim 7 regarding "misclassification cost," the specification at page 7, lines 14 and 15 cite: "An appropriate cost function may be incorporated into inducers in a conventional way." Again, without such disclosure one of ordinary skill would have to exercise undo experimentation to achieve the successful workings of this invention.

1. The Examiner has Failed to Establish a Prima Facie Case of Nonenablement

The Examiner merely asserts that "without such disclosure [regarding misclassification cost], one of ordinary skill would have to exercise undo experimentation to achieve the successful workings of this invention." The Examiner, however, fails to provide a rational basis as to why the disclosure in the present application does not teach the manner and process of making and using the invention of claim 7 to one of ordinary skill in the art, without undue experimentation, and dealing with subject matter that would not already be known to the skilled person as of the filing date of the application.

The specification teaches that (page 7, lines 3-15; emphasis added):

In one embodiment, the size of the ballpark class set 26 may be tailored to accommodate explicit statements about the cost of misclassification, a cost that may vary widely depending upon the nature of the classification application. For example, for an application such as pre-cancer detection, the cost of a misclassification may be extremely high. That is, erroneously labeling a healthy tissue as pre-cancerous may be corrected when further tests are performed, whereas labeling a pre-cancerous tissue as healthy may lead to disastrous consequences. Accordingly, for such applications, the size of the ballpark class set 26 may be increased based upon the

magnitude of the misclassification cost until a desired classification sensitivity is achieved. For other applications, such as text classification, the misclassification cost may be relatively low, in which case the size of the ballpark class set 26 may be relatively small. An appropriate cost function may be incorporated into first inducer 16 in a conventional way.

The Examiner has failed to explain why one skilled in the art could not select the subset of classes to which an instance is determined most likely to belong based at least in part upon a prescribed misclassification cost, as recited in claim 7, based on the teachings provided in the Specification of the present application. To incorporate misclassification cost into the selection of the subset of classes to which an instance is determined most likely to belong, one skilled in the art at the time of the invention would merely have to specify a relationship between the classes selected and a specified cost of misclassification. Anyone skilled in the art at the time of the invention readily could have incorporated misclassification cost into the selection of the subset of classes to which an instance is determined most likely to belong based on the disclosure in the present application.

For this reason, the Examiner's rejection of claims 1-20 under 35 U.S.C. § 112, second paragraph, should be withdrawn.

2. In any event, claims 1-20 are enabled

The general rule is that the subject matter required to enable the invention need only be found in the application and/or the prior art for the application to be enabling under Section 112, first paragraph.

As explained above, the specification teaches that (page 7, lines 3-15):

In one embodiment, the size of the ballpark class set 26 may be tailored to accommodate explicit statements about the cost of misclassification, a cost that may vary widely depending upon the nature of the classification application. For example, for an application such as pre-cancer detection, the cost of a misclassification may be extremely high. That is, erroneously labeling a healthy tissue as pre-cancerous may be corrected when further tests are performed, whereas labeling a pre-cancerous tissue as healthy may lead to disastrous consequences. Accordingly, for such applications, the size of the ballpark class set 26 may be increased based upon the magnitude of the misclassification cost until a desired classification sensitivity is achieved. For other applications,

such as text classification, the misclassification cost may be relatively low, in which case the size of the ballpark class set 26 may be relatively small. An appropriate cost function may be incorporated into first inducer 16 in a conventional way.

To incorporate misclassification cost into the selection of the subset of classes to which an instance is determined most likely to belong, as recited in claim 7, one skilled in the art at the time of the invention would merely have to specify a relationship between the classes selected and a specified cost of misclassification. Anyone skilled in the art at the time of the invention readily could have incorporated misclassification cost into the selection of the subset of classes to which an instance is determined most likely to belong based on the disclosure in the present application.

Alternatively, one skilled in the art at the time of the invention could have incorporated misclassification cost into the selection of the subset of classes to which an instance is determined most likely to belong, as recited in claim 7, based on, for example, the teachings provided in Pedro Domingos, "MetaCost: A General Method for Making Classifiers Cost-Sensitive," Proceedings of the Fifth International Conference on Knowledge Discovery and Data Mining, San Diego, CA, ACM Press, pp. 155-164, 1999 (cited in the Form PTO 1149 filed herewith).

### 3. Conclusion

For at least the reasons explained above, the Examiner's rejection of claim 7 under 35 U.S.C. § 112, first paragraph, based on his assertion of nonenablement of subset selection based on misclassification cost should be withdrawn.

### VI. Claim rejections under 35 U.S.C. § 101

The Examiner has rejected claims 1-19 under 35 U.S.C. § 101. In particular, the Examiner has indicated that:

The practical application test requires that a useful, concrete and tangible result be accomplished. Claims 1-19 represent abstract methodology capable of being performed by hand and therefore not in the technological art. The consequence is non-statutory.

The preamble of independent claim 1 has been amended so that the subject matter of the claim is directed to a machine-implemented method of classifying an instance into one or more classes selected from a set of potential classes. Independent claim 1 therefore is limited to a practical application within the technological arts because the claimed invention as a whole produces a practical application by producing a concrete, tangible, and useful result (see, e.g., MPEP § 2106 IV.B.1(b)). For this reason, independent claim 1 is directed to statutory subject matter under 35 U.S.C. § 101.

Claims 2-15 depend from independent claim 1 and therefore also are drawn to statutory subject matter.

The preamble of independent claim 16 has been amended so that the subject matter of the claim is directed to a data processing system for classifying an instance into one or more classes selected from a set of potential classes. Independent claim 16 therefore is limited to a practical application within the technological arts because the claimed invention as a whole produces a practical application by producing a concrete, tangible, and useful result (see, e.g., MPEP § 2106 IV.B.1(b)). For this reason, independent claim 16 is directed to statutory subject matter under 35 U.S.C. § 101.

Claims 17-19 depend from independent claim 16 and therefore also are drawn to statutory subject matter.

For the reasons explained above, the Examiner's rejection of claims 1-19 under 35 U.S.C. § 101 now should be withdrawn.

## VII. Claim rejections

The Examiner has rejected independent claims 1, 16, and 20 under 35 U.S.C. § 102(b) over Fujisaki (U.S. 5,835,633). In particular, the Examiner has asserted that:

Fujisaki anticipates selecting from the set of potential classes a subset of two or more classes to which the instance is determined to most likely belong (Fujisaki, c 1, l 8-18); and applying to the instance a scrutiny classifier generated from a set of training records corresponding to a class set inclusive of the selected subset of classes to identify at least one class to which the instance most likely belongs (Fujisaki, c 1, l 8-18).

Contrary to the Examiner's assertion, however, Fujisaki does not teach or suggest the step of selecting from the set of potential classes a subset of two or more classes to which the

instance is determined to most likely belong, nor does Fujisaki teach or suggest the step of applying to the instance a scrutiny classifier generated from a set of training records corresponding to a class set inclusive of the selected subset of classes to identify at least one class to which the instance most likely belongs. Rather, in Fujisaki's approach (col. 3, lines 1-18; emphasis added):

... the pre-classifier network develops different probabilities that the input character falls into different predefined "groups" (also called "partitions" or "subsets") of characters. Four predefined groups of characters, for example, may comprise (1) upper-case alphabetic letters, (2) lower-case alphabetic letters, (3) numerical digits, and (4) special symbols such as "&" or "\*" .

In contrast to the pre-classifier, each specialized network corresponds exclusively to a single group of characters. In performing its "fine" evaluation, a specialized network determines probabilities that the input character represents different predefined target characters of the specialized network's respective group. For instance, if a specialized network corresponds to a group comprising lower-case characters, the network develops probabilities that the input character corresponds to the members of its group, e.g., "a", "b", "c", etc.

That is, Fujisaki's classifier does select from the set of potential classes a subset of two or more classes to which the instance is determined to most likely belong. Instead, the pre-classifier simply assigns probabilities to each of the groups (or classes) of characters. In addition, none of the specialized networks is generated from a set of training records corresponding to a class set inclusive of a subset of two or more classes selected by the pre-classifier. Instead, each specialized network is generated from the members of a single respective group (of class) of characters.

For at least this reason, the Examiner's rejection of independent claims 1, 16, and 20 under 35 U.S.C. § 102(b) over Fujisaki should be withdrawn.

Claims 2-15 depend from independent claim 1 and claims 17-19 depend from independent claim 16. Therefore, claims 2-15 and 17-19 are patentable over Fujisaki for at least the same reasons explained above.

It is noted that claims 2-15 and 17-19 have not been rejected on the basis of any prior art. Therefore, these claims also are allowable for this additional reason.

Applicant : George H. Forman  
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VIII. Conclusion

For the reasons explained above, all of the pending claims are now in condition for allowance and should be allowed.

Charge any excess fees or apply any credits to Deposit Account No. 08-2025.

Respectfully submitted,

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Application No. 09/844,202  
Reply to Office action of Oct. 23, 2003  
Annotated Sheet Showing Changes

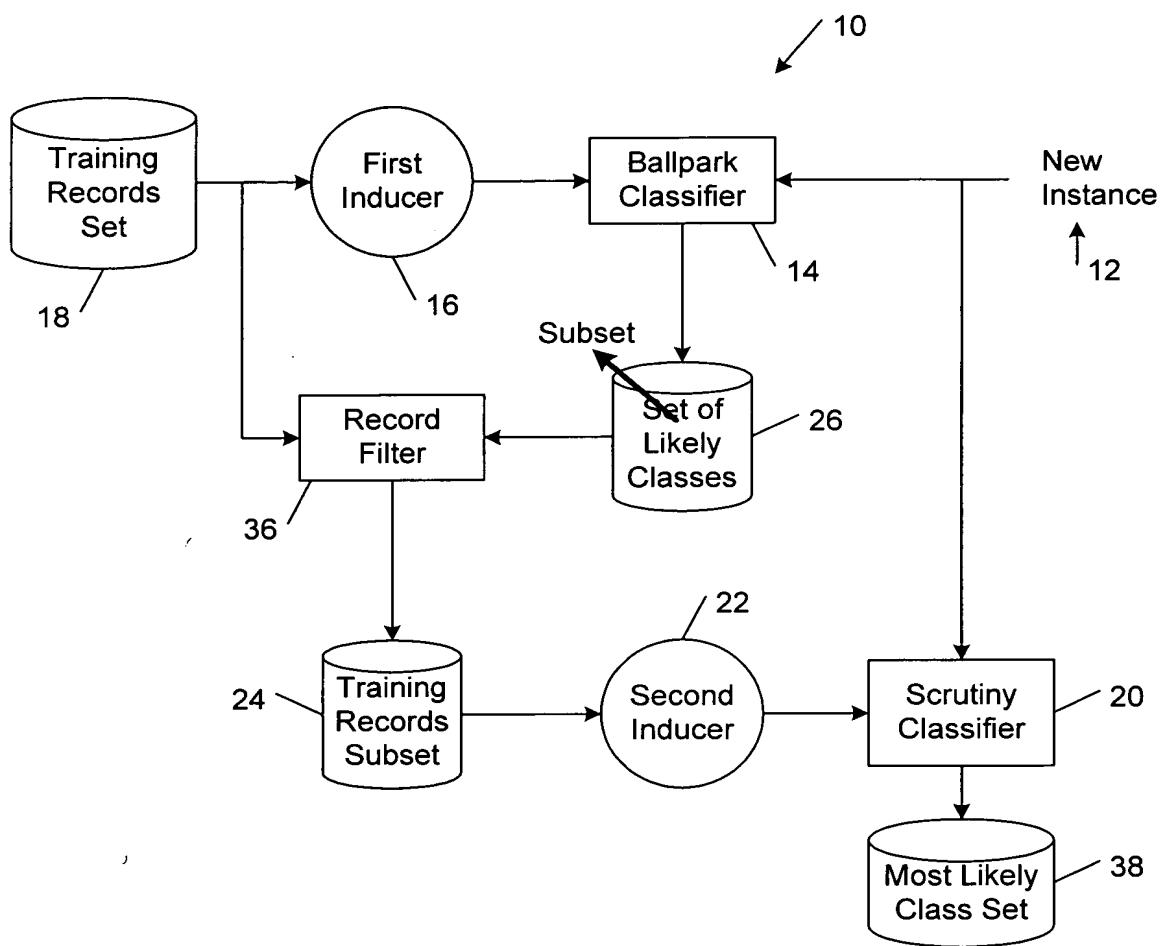


FIG. 1



Application No. 09/844,202  
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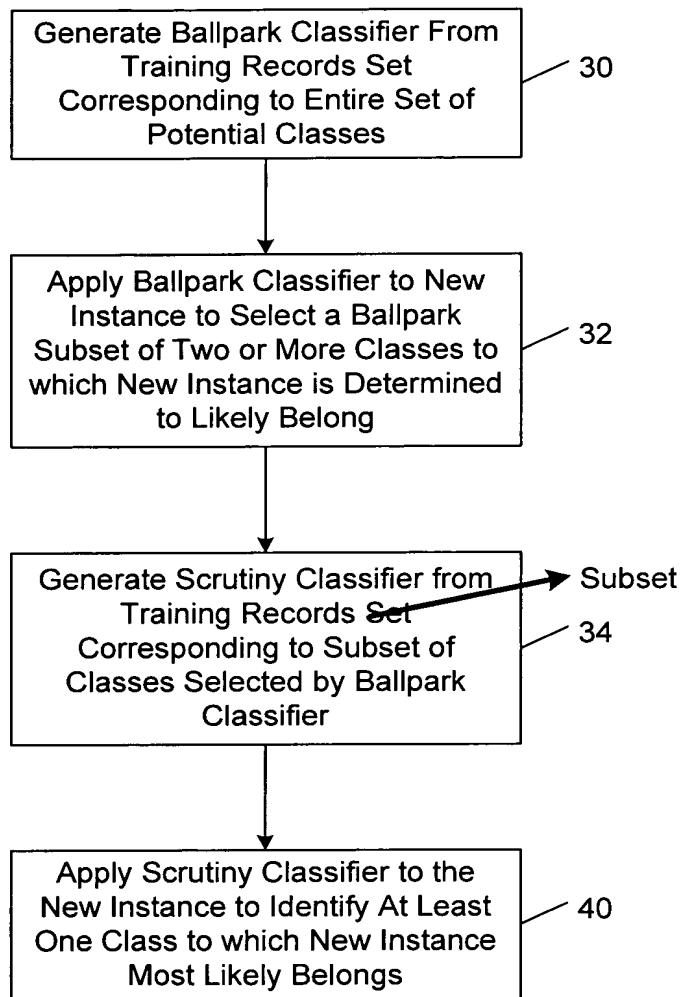


FIG. 2



Application No. 09/844,202  
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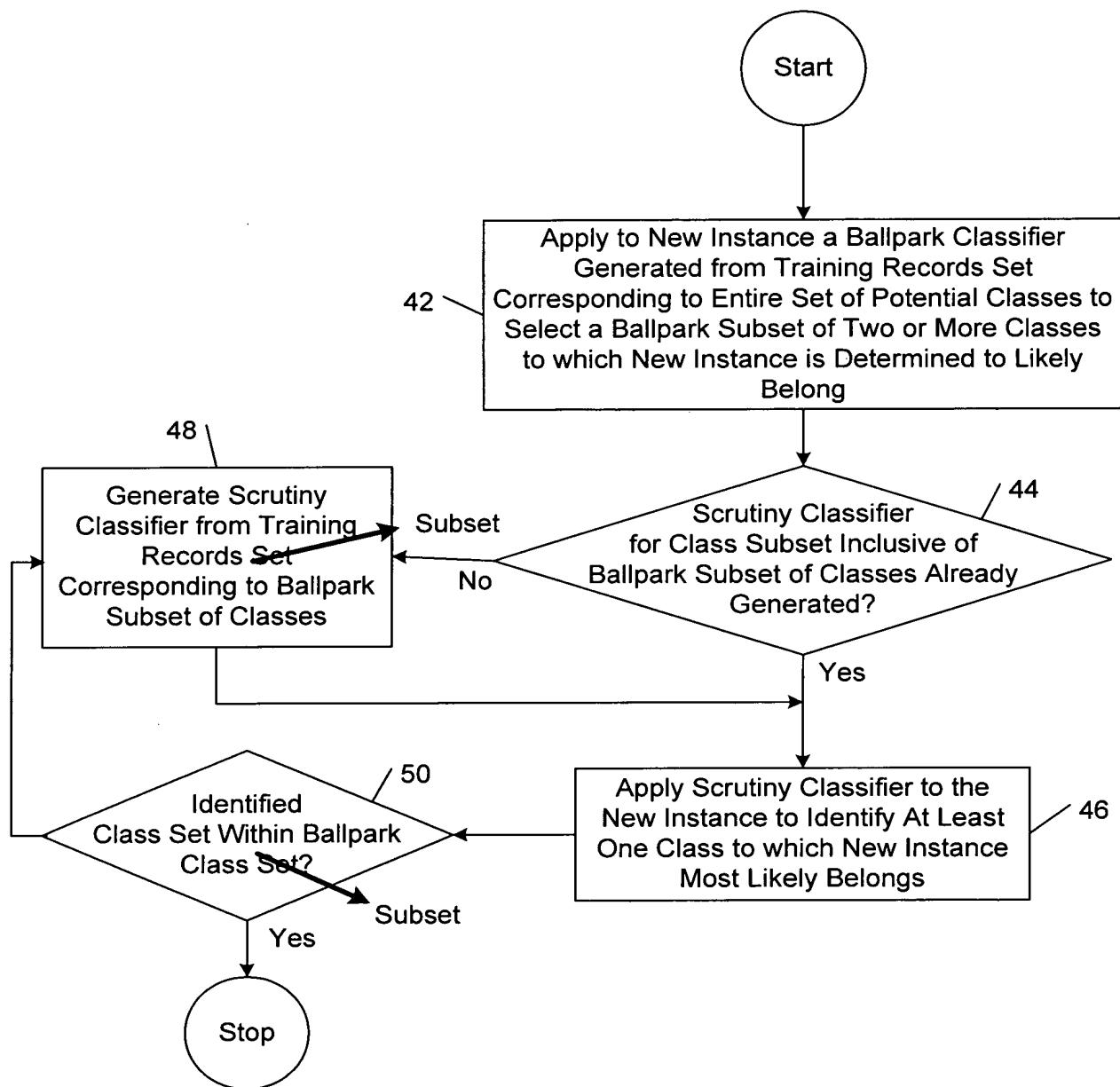


FIG. 3